"EFFICACY OF ACTIVE CYCLE OF BREATHING TECHNIQUE AND POSTURAL DRAINAGE IN PATIENTS WITH BRONCHIECTASIS - A COMPARATIVE STUDY"

A Dissertation Submitted to

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY

CHENNAI

In partial fulfilment of the requirements

for the award of the

MASTER OF PHYSIOTHERAPY

Degree Programme

Submitted by

Reg.No : 271430202

PPG COLLEGE OF PHYSIOTHERAPY

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COIMBATORE – 641 035

APRIL – 2016

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Under the guidance of

Prof.KS.RAJA SHENTHIL M.P.T (Cardio-Resp)., MIAP.,(PhD).,

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Dissertation Evaluated on _____

Internal Examiner **External Examiner**

CERTIFICATE I

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This is to certify that the dissertation entitiled **"EFFICACY OF ACTIVE CYCLE OF BREATHING TECHNIQUE AND POSTURAL DRAINAGE IN PATIENTS WITH BRONCHIECTASIS - A COMPARATIVE STUDY"** is a bonafide compiled work, carried out by **Register No: 271430202,** PPG College of Physiotherapy,Coimbatore-641035 in partial fulfillment for the award of degree in Master of Physiotherapy as per the doctrines of requirements for the degree from **THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI-32.** This work was guided and supervised by **Prof. KS.RAJA SHENTHIL M.P.T (Cardio-Resp).,MIAP.,(PhD).,**

DATE: **PRINCIPAL**

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ACKNOWLEDGEMENT

First I would like to thank the **Lord Almighty** and **My Parents**, **My Brothers and Friends** for their unfailing love, affection and endless blessings.

I express my sincere gratefulness to **Dr.L.P THANGAVELU M.S.,F.R.C.S., Chairman** and **Mrs.SHANTHI THANGAVELU M.A.,Correspondent**,PPG Group of institutions,Coimbatore for their encouragement and providing the source for the successful of the study.

With due respect,my most sincere thanks to **My Principal and Guide Prof. KS. RAJA SHENTHIL M.P.T (Cardio-Resp).,MIAP.,(PhD).,** who gave me his precious time and with his vast experience helped me to complete this dissertation successfully.

I would like to thank my Academic Incharge **Prof.Dr.M.SANKAR SAHAYARAJ M.P.T(Neurology),PGDSPT.,TTCY.,MIAP.,** for his valuable support throughout my studies.

I would like to thank my PG Class Co-ordinator **Prof.K.RAMADEVI M.P.T(Cardio-Resp)** for his valuable support throughout my studies.

Several special people have guided me and have contributed significantly to this effort. I thank my **faculty members** for their constant support and cheer all along in achieving the goal.

My hearty thanks to some Private Hospital Physiotherapists who gave me an opportunity to do my project work in their hospitals.

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CHAPTER-I

INTRODUCTION

Bronchiectasis is one of the most common diseases in the rural and industrial areas of India. There are reports of high prevalence in relatively isolated populations with poor access to health care and high rates of respiratory tract infections during childhood. Bronchiectasis is an abnormal dilatation of the bronchi associated with obstruction and infection. Clinically, Bronchiectasis is defined as an abnormal dilatation of medium size bronchi and bronchioles (about the fourth to ninth generations), generally associated with previous, chronic necrotizing infections within these passages. The etio-pathogenesis of Bronchiectasis is related to bronchial obstructions, infections or both in a large majority of patients. The condition most commonly affects the lower lobes, the lingula and then the middle lobe.It tends to affect the left lung more than right, although 50% of cases are bilateral.It is an uncommon disease with the potential to cause devastating illness including repeated respiratory infections requiring antibiotics, disabling productive cough, shortness of breath, and occasional haemoptysis.

Typical signs and symptoms include; Sputum overproduction, Fever, Pleurisy, Dyspnoea, Chronic cough, Haemoptysis, Added sounds, Clubbing. Pulmonary function test of patients with localized bronchiectasis show reduction in FEV1, maximal mid expiratory flow rate, Maximal voluntary ventilation (MVV), diffusing capacity and increase in residual volume. Spirometry often shows a limitation of airflow with a reduced ratio of forced expiratory volume in one second (FEV1) to forced vital capacity (FVC), a normal or slightly reduced FVC, and a reduced FEV1. A reduced FVC may indicate that airways are blocked by mucus, which collapse with forced exhalation or there is pneumonitis in the lung. High-resolution CT has become the best tool for diagnosing bronchiectasis, clarifying the findings from chest radiography and mapping airway abnormalities that cannot be seen on plain films of the chest. The invention of Broad spectrum antibiotics in this era has lessened the mortality and morbidity rate in respiratory infective diseases. The most accepted treatment protocol preferred for Bronchiectasis now days includes oral, aerosolized or intravenous antibiotic therapy according to the severity of the exacerbation and mucus clearance by means of bronchial

hygiene assistive devices, surgical resection, chest physiotherapy like breathing exercises, postural drainage, high-frequency chest compression, forced expiratory techniques etc Enhancing the removal of respiratory secretions in patients with bronchiectasis is beneficial.Physical means such as gravitational postural drainage and the forced expiration technique (FET) used for chest physiotherapy may also be effective. In addition to the control of cough, postural drainage, chest physiotherapy, thinning and loosening of secretions, the administration of a bronchodilator and of inhaled corticosteroids has been a part of maintenance therapy and treatment for acute exacerbations. ACBT could an effective method of airway clearance technique in Bronchiectasis and it is effective in cleaning secretions and improving lung functions. These techniques can be used in stable COPD patients according to the patient's and the Physiotherapist's preferences.

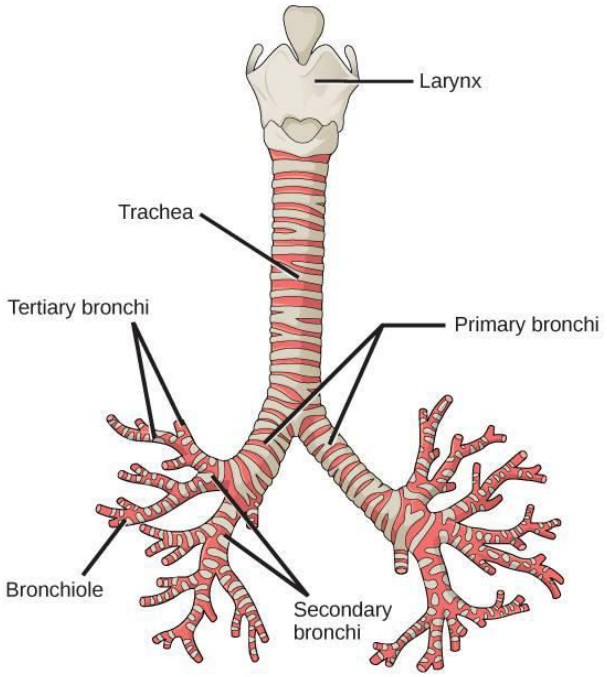
Pulmonary Function Test, Oxygen saturation and Peak Expiratory Flow Rate can measure the effects of postural drainage and Active Cycle of Breathing Techniques. Monitoring Pulmonary Function Test provides a guide to the state and function of the respiratory system. It indicates the Forced Expiratory Volume in one second (FEV1), Vital capacity, Forced Vital Capacity, the Peak Expiratory Flow Rate and oxygen saturation (SPO_2) which are used as means of monitoring the effects of postural drainage and active cycle of breathing techniques in bronchiectasis.There is not enough evidence to support or refute the use of bronchial hygiene physical therapy in patients with chronic obstructive pulmonary disease and bronchiectasis. Considering the above factors, the need arises to examine the effects of broncho-pulmonary hygiene physical therapy and to compare the efficacy of Active cycle of breathing technique versus Postural drainage in the management of patients with bronchiectasis to know which technique is more effective for patients with Bronchiectasis.

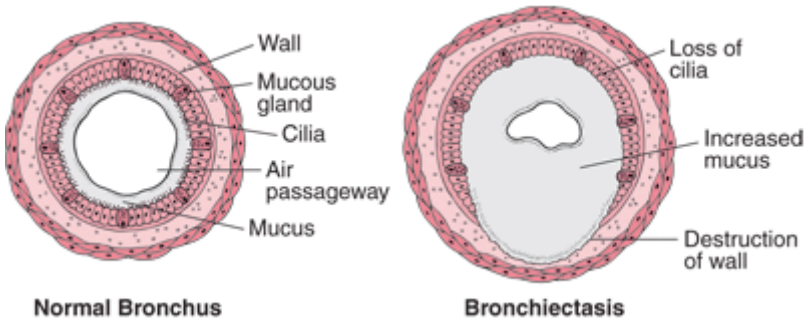
1.1 ANATOMY

Bronchiectasis is a disease in which there is permanent enlargement of parts of the airways of the lung. Symptoms typically include a chronic cough productive of mucus. Other symptoms include shortness of breath, coughing up blood and chest pain. Wheezing and nail clubbing may also occur. Those with the disease often get frequent lung infections.

Bronchiectasis may result from a number of infective and acquired causes, including pneumonia, tuberculosis, immune system problems, and cystic fibrosis. Cystic fibrosis eventually results in severe bronchiectasis in nearly all cases. The cause in 10-50% of those without cystic fibrosis is unknown. The mechanism of disease is breakdown of the airways due to an excessive inflammatory response. Involved bronchi become enlarged and thus less able to clear secretions. These secretions increase the amount of bacteria in the lungs, result in airway blockage and further breakdown of the airways. It is classified as an obstructive lung disease, along with Chronic obstructive pulmonary disease and Asthma. The diagnosis is suspect based on a person's symptoms and confirmed using computed tomography. Sputum cultures may be useful to determine treatment in those who have acute worsening and at least once a year.

Worsening may occur due to infection and in these cases antibiotics are recommended. Typical antibiotics used include amoxicillin and in those who are allergic erythromycin or doxycycline. Antibiotics may also be used to prevent worsening of disease. Airway clearance techniques, postural drainage are recommended. Medications to dilate the airways may be useful in some but the evidence is not very good. The use of inhaled steroids have not been found to be useful. Surgery, while commonly done, has not been well studied. Lung transplantation may be an option in those with very severe disease. While the disease may cause significant health problems many other people with the disease do well.





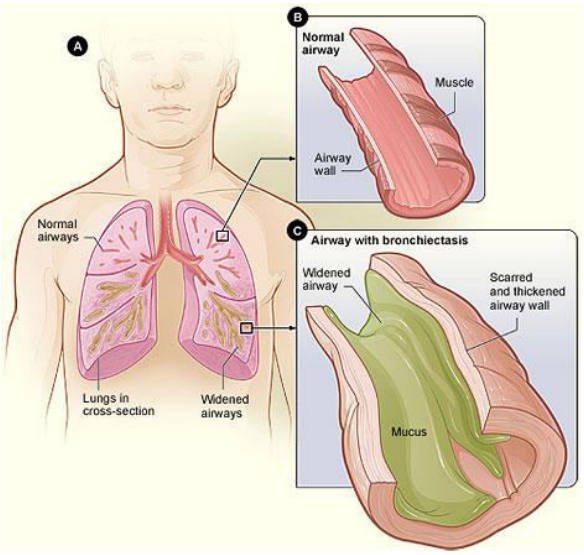


Fig 1 ANATOMY OF BRONCHIECTASIS

1.2 EPIDEMIOLOGY

In the United Kingdom the disease affects about 1 per 1000 adults. The disease is more common in male and increases as people age. It was first described by **RENE LAENNEC** in 1819.

1.3 PATHOPHYSIOLOGY

Bronchiectasis is a result of chronic inflammation compounded by an inability to clear mucoid secretions. This can be a result of genetic conditions resulting in a failure to clear sputum (primary ciliary dyskinesia), or resulting in more viscous sputum (cystic fibrosis), or the result of chronic or severe infections. Inflammation results in progressive destruction of the normal lung architecture, in particular the elastic fibres of bronchi. Endobronchial tuberculosis commonly leads to bronchiectasis, either from bronchial stenosis or secondary traction from fibrosis.

Diagnostic Tests and Procedures

Chest CT Scan

This painless test creates precise pictures of your airways and other structures in your chest. A chest CT scan can show the extent and location of lung damage.

Chest X Ray

This painless test creates pictures of the structures in your chest, such as your heart and lungs. A chest x ray can show areas of abnormal lung and thickened, irregular airway walls.

Other Tests

- Blood tests.

These tests can show whether you have an underlying condition that can lead to bronchiectasis. Blood tests also can show whether you have an infection or low levels of certain infection-fighting blood cells.

- Sputum culture.

Lab tests can show whether a sample of your sputum contains bacteria (such as the bacteria that cause tuberculosis) or fungi.

- Lung function tests.

These tests measure how much air you can breathe in and out, how fast you can breathe air out, and how well your lungs deliver oxygen to your blood. Lung function tests help show how much lung damage you have.

- A sweat test or other tests for cystic fibrosis.

Bronchoscopy

Bronchoscopy, a flexible tube with a light on the end is inserted through your nose or mouth into your airways. The tube is called a bronchoscope. It provides a video image of your airways. Bronchoscopy can show whether you have a blockage in your airways. The procedure also can show the source of any bleeding in your airways.

1.4 SIGNS AND SYMPTOMS

- Chronic Coughing.
- Coughing up blood.
- Abnormal Sounds or Wheezing in the Chest on Breathing.
- Shortness of Breath.
- Chest Pain.
- Coughing up large amounts of Mucus daily.
- Bad Breath Odour.
- Skin with a blue appearance.

1.5 AETIOLOGY

Bronchiectasis has both congenital and acquired causes, with the latter more frequent.

Acquired causes

Bronchiectasis secondary to a large carcinoid tumor (not shown) that was completely obstructing the bronchus proximally. The yellowish discoloration of lung parenchyma reflects obstructive pneumonia.

Tuberculosis, pneumonia, inhaled foreign bodies, allergic broncho pulmonary aspergillosis and bronchial tumours are the major acquired causes of bronchiectasis.

Infective causes associated with bronchiectasis include infections caused by theStaphylococcus, Klebsiella or Bordetella pertussis, the causative agent of whooping cough.

Aspiration of ammonia and other toxic gases, pulmonary aspiration, alcoholism, heroin (drug use), various allergies all appear to be linked to the development of bronchiectasis.

Various immunological and lifestyle factors have also been linked to the development of bronchiectasis.

- Childhood Acquired Immune Deficiency Syndrome (AIDS), which predisposes patients to a variety of pulmonary ailments, such as pneumonia and other opportunistic infections.
- Inflammatory bowel disease, especially ulcerative colitis. It can occur in Crohn's disease as well, but does so less frequently. Bronchiectasis in this situation usually stems from various allergic responses to inhaled fungal spores. A Hiatal hernia can cause Bronchiectasis when the stomach acid that is aspirated into the lungs causes tissue damage.
- Rheumatoid arthritis suffers who smoke appear to have a tenfold increased prevalence of the disease. Still, it is unclear as to whether or not cigarette smoke is a specific primary cause of bronchiectasis.

No cause is identified in up to 50% of non-cystic-fibrosis related bronchiectasis.

Congenital causes

Bronchiectasis may result from congenital infections that affect cilia motility or ion transport.

Kartagener syndrome is one such disorder of cilia motility linked to the development of bronchiectasis.

A common cause is cystic fibrosis, which affects chloride ion transport in which a small number of patients develop severe localized bronchiectasis.

Young's syndrome, which is clinically similar to cystic fibrosis is thought to significantly contribute to the development of bronchiectasis. This is due to the occurrence of chronic infections of the sinuses and bronchiole tree.

Other less-common congenital causes include primary immuno deficiencies due to the weakened or non-existent immune system response to severe, recurrent infections that commonly affect the lung.

Several other congenital disorders can also lead to bronchiectasis, including Williams-Campbell syndrome and Marfan syndrome. Patients with alpha 1-antitrypsin deficiency have been found to be particularly susceptible to bronchiectasis for unknown reasons.

1.6 OPERATIONAL DEFINITIONS

BRONCHIECTASIS

Bronchiectasis (brong-ke-EK-ta-sis) is a condition in which damage to the airways causes them to widen and become flabby and scarred.

ACTIVE CYCLE OF BREATHING TECHNIQUE

The Active Cycle of Breathing Techniques (ACBT) is a set of breathing exercises that loosens and clears the sputum from your airways. The ACBT exercises are breathing control, deep breathing and huffing which are performed in a cycle.

POSTURAL DRAINAGE

Postural drainage is used to treat breathing problems due to swelling and too much mucus in the airways of the lungs.Postural drainage, helps drain fluid out of the lungs. It helps to treat or prevent an infection.

PULMONARY FUNCTION TEST

Pulmonary function tests are a group of tests that measure how well the lungs take in and release air and how well they move gases such as oxygen from the atmosphere in to the body's circulation.

PULSE OXYMETRY

Pulse oxymetry is a noninvasive method for monitoring a person's oxygen saturation (SpO_2).

1.7 NEED FOR THE STUDY

Bronchiectasis is one of the most common diseases in the rural and industrial areas of India. The most accepted treatment protocol preferred for Bronchiectasis now a days includes oral, aerosolized or intravenous antibiotic therapy according to the severity of the exacerbation and mucus clearance by means of bronchial hygiene assistive devices, surgical resection, chest physiotherapy like breathing exercises, postural drainage, high-frequency chest compression, forced expiratory techniques etc. Active cycle of breathing techniques (ACBT) is also the standard airway clearance technique used in patients with bronchiectasis. So this study is intended to know and compare the effectiveness of ACBT and Postural drainage techniques as a means of treatments in patients with bronchiectasis .

1.8 AIM OF THE STUDY

- The Aim of this study is to compare the effectiveness of ACBT and Postural drainage techniques as a means of treatments in patients with bronchiectasis.

1.9 OBJECTIVES OF THE STUDY

- To have in-depth knowledge in bronchiectasis patients.
- To improve the quality of life in patients with bronchiectasis.
- To find out the effectiveness of ACBT in improving the airway clearance in patients with bronchiectasis.
- To find out the effectiveness of Postural drainage in improving the airway clearance in patients with bronchiectasis.
- To compare the effectiveness of ACBT and Postural drainage in improving the airway clearance in patients with bronchiectasis.

1.10 HYPOTHESIS

1.10 (a). NULL HYPOTHESIS

- There is no significant difference in between the effect of ACBT and Postural drainage in improving the airway clearance in patients with bronchiectasis.

1.10 (b). ALTERNATE HYPOTHESIS

- There is significant difference between the effect of ACBT andPostural drainage in improving the airway clearance in patients with bronchiectasis.

1.11 ASSUMPTION

- The study had been conducted assuming that ACBT and Postural drainage will improves the airway clearance in patients with bronchiectasis.

1.12 PROJECTED OUTCOME

- Based on the Review of literature the outcome of my study will be that both ACBT and Postural drainage will improves the airway clearance in patients with bronchiectasis. Further ACBT is more effective in improving the airway clearance in patients with bronchiectasis.

CHAPTER-2

REVIEW OF LITERATURE

1. Ada Clarice Gastaldi, PhD, Paolo Paredi, MD, AnjanaTalwar, MD, Sally Meah, Peter J. Barnes, and Omar S. Usmani, MD LeventDalar. (2015)

This study aims to evaluate the acute effects of an oscillating positive expiratory pressure device (flutter) on airways resistance in patients with chronic obstructive pulmonary disease (COPD). 15 COPD outpatients with thirty minutes of flutter exercises: a "flutter-sham" procedure was used as a control, and airway responses after a short-acting bronchodilator were also assessed. The use of flutter can decrease the respiratory system resistance and reactance and expiratory flow limitation in stable COPD patients with small amounts of secretions.

2. EleonoraVolpato, Paolo Banfi, Sheena Michelle Rogers, and Francesco Pagnini (2015)

This meta-analysis aimed to assess evidence from the scientific literature on the effects of relaxation techniques, investigated 9 databases to select 25 RCTs. The assessed quality of the studies, based on the Pedro Scale, was generally medium/high. Relaxation training can have a moderate impact on both psychological well-being and respiratory function, resulting in noticeable improvements in both. Although higher quality research is required, our results sustain the importance of relaxation techniques as a tool to manage COPD.

3.Warnock L, Gates A (2015)

This author conducted study of Chest physiotherapy compared to no chest physiotherapy for cystic fibrosis. Chest physiotherapy is widely used in people with cystic fibrosis in order to clear mucus from the airways. To determine the effectiveness and acceptability of chest physiotherapy compared to no treatment or spontaneous cough alone to improve mucus clearance in cystic fibrosis The results of this review show that airway clearance techniques have short-term effects in the terms of increasing mucus transport.

4. Wei-jie Guan, Yong-hua Gao, Hui-min Li, Jing-jing Yuan, Rong-chang Chen,, and Nan-shanZhong, James D. Chalmers (2015)

In this 148 consecutive adults with clinically stable bronchiectasis. CRS diagnosed based on the 2012 EP3OS criteria, systematically evaluated the bronchiectasis etiology, radiology, lung function, sputum bacteriology, airway inflammatory biomarkers, Bronchiectasis Severity Index, cough sensitivity and healthcare resource utilization. All patients were prospectively followed-up for 1 year to examine the frequency of bronchiectasis exacerbations (BEs); findings may be of clinical significance in that proper treatment of upper airway symptoms due to CRS will be theprevention of infection or re-infection of the tracheobronchial tree, which should be addressed for the future management of bronchiectasis

5. BR McCurdy (2014)

This project emerged from a request by the Health System Strategy Division of the Ministry of Health and Long-Term Care that MAS provide them with an evidentiary platform on the effectiveness and cost-effectiveness of COPD interventions.After an initial review of health technology assessments and systematic reviews of COPD literature, and consultation with experts, MAS identified the following topics for analysis: vaccinations (influenza and pneumococcal), smoking cessation, multidisciplinary care, pulmonary rehabilitation, long-term oxygen therapy, noninvasive positive pressure ventilation for acute and chronic respiratory failure, hospital-at-home for acute exacerbations of COPD, and telehealth (including telemonitoring and telephone support). In addition, a review of the qualitative literature on patient, caregiver, and provider perspectives on living and dying with COPD was conducted.

6. James D. Chalmers, Pieter Goeminne, Stefano Aliberti, Melissa J. McDonnell, Sara Lonni, John Davidson,LucyPoppelwell, Waleed Salih, Alberto Pesci, Lieven J. Dupont, Thomas C. Fardon, Anthony De Soyza, and Adam T. Hill (2014)

It describes the derivation and validation of the Bronchiectasis Severity Index (BSI). Derivation of the BSI used data from a prospective cohort study (Edinburgh, UK, 2008–2012) enrolling 608 patients. In the validation cohorts, the AUC for mortality ranged from 0.81 to 0.84 and for hospitalization from 0.80 to 0.88. The BSI is a useful clinical predictive tool that identifies patients at risk of future mortality, hospitalization, and exacerbations across healthcare systems

7.Huber LC, Bürgi U, Schuurmans MM, Benden C (2014)

They conducted a study of Non-cystic fibrosis bronchiectasis: diagnosis and treatment. Bronchiectasis is the term used for irreversibly dilated airways.But the morphological findings are increasingly detected and the associated syndrome is more frequently diagnosed.Chronic infection with Pseudomonas aeruginosa is associated with a severe course of the disease and its detection has impacts on the therapeutic management.

8. AntonelloNicolini, Federica Cardini, Norma Landucci, Sergio Lanata, Maura Ferrari-Bravo, and Cornelius Barlascini. (2013)

High-frequency airway clearance (HFCWC) assist devices generate either positive or negative trans-respiratory pressure excursions to produce high-frequency, small-volume oscillations in the airways. 37 patients were enrolled;10 patients treated with HFCWO by using the Vest® Airway Clearance System;10 patients treated with traditional techniques of air way clearance (PEP bottle, PEP mask, ELTGOL, vibratory positive expiratory pressure); 10 patients received medical therapy only (control group). Both treatments (traditional CPT and HFCWO) showed a significant improvement in some biochemical and functional respiratory tests as well as in the quality of life compared to the control group. The HFCWO technique provides an improvement both in pulmonary function and quality of life related parameters in patients with chronic hypersecretive disease.

9. Bita Rabbani, KatayoonNajafizadeh, et al (2013)

The aim of this study was to evaluate the effect of halotherapy on pulmonary function tests and quality of life of non-CF bronchiectatic patients.This clinical trial evaluated the results of spirometry and 6-minute walk test as well as the quality of life (according to SF-36 questionnaire) of stable non-CF bronchiectatic patients presenting to the pulmonary clinic before and after the use of salt spray for 2 months.Of 40 study patients, 20 were excluded due to various reasons and 20 were evaluated. The mean age of patients was 35±11 years and the underlying cause of disease was chronic pulmonary infection in 65% of cases, patients were satisfied with halotherapy and requested to receive the medication again. Our study results indicated that 2-month halotherapy with Salitair inhaler containing salt crystals extracted from the Klodawa mine in Poland could not improve the pulmonary function tests or quality of life of non-CF bronchiectatic patients.

10.Santamato A, Ranieri M, Panza F, Frisardi V, Marvulli R, Filoni S, Cisari C, Fiore P (2012)

This study has been conducted for Pulmonary rehabilitation patients with bronchiectasis. It evaluated the efficacy of PR in the management of bronchiectasis. PR program consisting in treadmill walking, cycle ergometry, breathing exercises, and postural drainage with clapping percussion-vibratory-shaking . The significant improvements in both exercise capacity and health status observed at the end of the PR program.

11. Susan D Hanekom, Dina Brooks, Linda Denehy, Monika Fagevik-Olsén, Timothy C Hardcastle, ShamilaManie, and QuinetteLouw (2012)

Postoperative pulmonary complications remain the most significant cause of morbidity following open upper abdominal surgery despite advances in preoperative care. The objective was to develop a clinical management algorithm for the post operative management of abdominal surgery patients. Eleven draft algorithm statements extracted from the extant literature by the primary research team were verified and rated by scientist clinicians (n = 5) in an electronic three round Delphi process. An expert Delphi panel interpreted the equivocal evidence for the physiotherapeutic management of

patients following upper abdominal surgery. Through a process of consensus a clinical management algorithm was formulated.

12. IndranilChakravorty,KamaljitChahal, and Gillian Austin (2011)

A randomized controlled crossover pilot study of HFCWO compared with conventional treatment was conducted in 22 patients with moderate to severe COPD and mucus hypersecretion. Sputum production showed a declining trend in the HFCWO phase, although not reaching statistical significance. The HFCWO device was well tolerated with good reported compliance.This pilot study demonstrated that patients with advanced COPD and mucus hypersecretion at increased risk of declining lung function tolerated the HFCWO treatment well, leading to improvement in quality of life and reduced symptoms.

13. Valentina Fainardi,a Francesco Longo,a Silvia Faverzani, et al (2011)

The study was to compare the short-term efficacy of high-frequency chest compression and positive expiratory pressure mask on expectorated sputum, pulmonary function, and oxygen saturation in patients with CF hospitalized for an acute pulmonary exacerbation. Thirty-four CF patients (26 ± 6.5 years) were included in the study. Before and 30 minutes after each treatment were recorded: pulmonary function testing, oxygen saturation, and perceived dyspnea. High-frequency chest compression and positive expiratory pressure mask have comparable short-term effects on expectorated sputum and lung function. Although positive expiratory pressure mask was associated with a lower SpO_2, it was better tolerated than high-frequency chest compression.

14. Leyla P Osman, Michael Roughton, Margaret E Hodson, and Jennifer A Pryor (2010)

High frequency chest wall oscillation (HFCWO) is standard treatment for airway clearance in the USA and has recently been introduced in the UK and Europe. The aim of this study was to compare the short-term effects of HFCWO with usual ACTs in patients with cystic fibrosis hospitalised with an infective pulmonary exacerbation.During both a finite treatment period and over 24 h, less sputum was cleared using HFCWO than usual

ACT. HFCWO does not appear to cause any adverse physiological effects and may influence adherence.

15.McIlwaine M, Wong LT, Chilvers M, Davidson GF (2010)

This study describes the Long-term comparative trial of two different physiotherapy techniques; postural drainage with percussion and autogenic drainage, in the treatment of cystic fibrosis. Thus the various airway clearance techniques have been introduced for the treatment of cystic fibrosis. It was hypothesized that autogenic drainage, and airway clearance technique would be as effective as postural drainage with percussion in treating patients with CF. Results suggest that both autogenic drainage and postural drainage are effective methods of performing physiotherapy for cystic fibrosis patients.

16. Farley AH, Hendry C, Johnstone CC (2008)

This study Reveals the pathophysiology, presentation and management. Bronchiectasis, although not as common as other respiratory disorders, can be life-limiting and remains a significant problem for many patients.It examines the pathophysiology and presentation of bronchiectasis and identifies various management strategies.

17. C Thompson, S Harrison, J Ashley, K Day, and D Smith (2002)

A randomised crossover study was performed in 17 stable patients with non-cystic fibrosis bronchiectasis at home, in which 4 weeks of daily active cycle of breathing technique (ACBT) were compared with 4 weeks of daily physiotherapy with the Flutter device. A questionnaire indicated subjectively that patients preferred the Flutter (11/17) to ACBT for routine use.Daily use of the Flutter device in the home is as effective as ACBT in patients with non-cystic fibrosis bronchiectasis and has a high level of patient acceptability.

18.Singleton R, Morris A, Redding G, Poll J, Holck P, Martinez P, Kruse D, Bulkow LR, Petersen KM, Lewis C.(2000)

It reviewed case histories of 46 children with bronchiectasis, observed that recurrent pneumonia was the major preceding medical condition in 85% of patients.

Itconclude that the continued high prevalence of bronchiectasis appears to be related to extremely high rates of infant and childhood pneumonia.

19. S. Miller, D. O. Hall, C. B. Clayton, and R. Nelson (1995)

In this study autogenic drainage was compared with the active cycle of breathing techniques (ACBT) together with postural drainage.Eighteen patients with cystic fibrosis took part in a randomised two-day crossover trial. There were two sessions of one method of physiotherapy on each day, either autogenic drainage or ACBT. Both methods improved ventilation, autogenic drainage was found to be as good as ACBT at clearing mucus in patients with cystic fibrosis and is therefore an effective method of home physiotherapy. Patients with cystic fibrosis should be assessed as to which method suits them best

20. R Polosa, AHasani, D Pavia, J E Agnew, C K Lai, S W Clarke, and S T Holgate (1992)

To evaluate this possibility the effect of inhaled bradykinin on mucociliary clearance has been studied in 10 healthy volunteers. Subjects attended the laboratory on two occasions to take part in tracheobronchial clearance studies using a non-invasive radioisotopic technique. Inhalation of radioaerosol was followed 30 minutes later by inhalation of either bradykinin (8 mg/ml) or vehicle placebo in a randomised, double blind fashion. After each inhalation the number of coughs was recorded. The median values (range) for AUC0-6h were significantly reduced from 126% (78-232%)/h with placebo to 87% (51-133%)/h with bradykinin. It is concluded that acute exposure to inhaled bradykinin accelerates tracheobronchial clearance in normal human airways.

21. J A Pryor, B A Webber, and M E Hodson (1990)

Decreasing arterial oxygen saturation has been reported in patients with cystic fibrosis during postural drainage when this was combined with other manoeuvres.When these features were included in an active cycle of breathing techniques during postural drainage in 20 patients with cystic fibrosis there was no fall in arterial oxygen saturation during the procedure (mean values 87.1%, 87.9%, and 86.7% before, during, and after treatment).

22. C P van der Schans, D A Piers, and D S Postma (1987)

The effect of manual percussion of the thorax in nine patients with stable chronic airflow obstruction and excessive tracheobronchial secretion. Tracheobronchial clearance was measured over 50 minutes on three different days. It is apparent that manual percussion is a relatively ineffective procedure in patients with stable chronic airflow obstruction, but may be useful when the patient is not able to cough and cannot assume the appropriate position for postural drainage.

23. J L Hofmeyr, B A Webber, and M E Hodson (1986)

Three treatment regimens were compared in 18 patients with cystic fibrosis. Treatment A consisted of breathing exercises emphasising inspiration, interspersed with the forced expiration technique in gravity assisted positions; treatment B comprised breathing exercises with positive expiratory pressure alternating with the forced expiration technique in the same gravity assisted positions; and treatment C comprised breathing exercises with positive expiratory pressure and the forced expiration technique in the sitting position. There were no significant differences in arterial oxygen saturation, FEV1 or forced vital capacity. Sputum clearance was less effective when positive expiratory pressure was included in the treatment regimen.

24.**Mazzocco MC, Owens GR, Kirilloff LH, Rogers RM (1985)**

The study of Chest percussion and postural drainage in patients with bronchiectasis. It i to determine the effects of chest physical therapy on pulmonary function, arterial oxygenation, and sputum production and to assess whether this therapy was associated with any significant side-effects. It is found that chest physical therapy was safe and well tolerated and assisted the patients in mobilization of their sputum.

25. J A Pryor, B A Webber, M E Hodson, and J C Batten (1979)

Sixteen patients with cystic fibrosis were treated with conventional physiotherapy aided. The results were compared with those produced by physiotherapy using the forced expiration technique cleared more sputum in less time than conventional physiotherapy. A sputum in less time than conventional physiotherapy. The forced expiration technique might also be helpful for patients with chronic bronchitis, asthma, or bronchiectasis.

CHAPTER-3

MATERIALS AND METHODOLOGY

3.1 MATERIALS

- Treatment couch
- Treatment chair
- Towel
- Stop clock
- Stethescope
- B.P Apparatus

3.2 METHODOLOGY

- All patients underwent a cardio examination and posture evaluation.
- CT Lungs and X ray shows the severity of Bronchiectasis.
- PFT and Pulse Oxymeter is conducted to know how the patients affected with Bronchiectasis.

3.3 POPULATION

- Patients with age group of 30-60 years having severity of Bronchiectasis.

3.4 CRITERIA FOR SAMPLE SELECTION

3.4 (a) INCLUSION CRITERIA

- Both genders.
- Age group between 30-60 years.
- Sufficient hearing and vision.
- Cases of isolated bronchiectasis.
- Unilateral lung invovlvement

3.4 (b) EXCLUSION CRITERIA

The exclusion Criteria were conditions with symptoms of raised intra cranial pressure, Head and neck injury until stabilized, Active haemorrhage with hemodynamic instability, Recent spinal surgery (e.g., Laminectomy) or acute spinal injury, active haemoptysis, Empyema, Broncho pleural fistula, Pulmonary oedema associated with congestive heart failure, Large pleural effusions, pulmonary embolism, Aged, confused, or anxious patients who do not tolerate position changes, Rib fracture, with or without flail chest, Tumours, Active cases of tuberculosis.

3.5 SOURCE OF DATA

- SIMS Hospital,Erode.
- KMCH Hospital,Erode.
- DHANVANTHRI Hospital,Erode.

3.6 SAMPLE SIZE

☆ Sample size is 30 subjects

- Group A-15 patients
- Group B-15 patients

3.7 STUDY DESIGN

☆ Quasi Experimental design

- Pre and Post experimental Study Design

3.8 SAMPLING METHOD

- Convenient Sampling Method

3.9 DURATION OF THE STUDY

- The total duration of the study is 6 Months.

3.10 TREATMENT DURATION

Active cycle of breathing technique for 15 - 20 minutes. Each standardized ACBT cycle lasted around two minutes. Three treatment sessions in a day were given with an interval of four hours between each session.

3.11 PARAMETER

- Pulmonary Function Test
- Pulse Oxymetry

VARIABLES

- Forced Vital Capacity (FVC)
- Forced Expiratory Volume in one second (FEV1)
- Peak Expiratory Flow Rate (PEFR)
- Pulse Oxymetry

3.12 PROCEDURE

The subjects were explained about the treatment, experimental procedures and outcome measures. Formal written consent was obtained from each subject and ethical clearance was obtained from Institutional Ethical Committee of PPG College of Physiotherapy. The selected 30 subjects were then randomly assigned to any of the two experimental treatment groups i.e. Group A and Group B of 15 subjects each. Group A, received Active cycle of breathing technique for 15 - 20 minutes. Each standardized ACBT cycle lasted around two minutes. During the study the total number of ACBT cycle performed during the treatment phase was individualized and not set. Three treatment sessions in a day were given with an interval of four hours between each session. Total study period was for eight hours. ACBT was administered to the affected lobe after explaining the procedure to the patients. Group B, have received postural drainage for 15–20 minutes. Three treatment sessions in a day were given with an interval of four hours between each session. Total study period was for eight hours and traditional postural drainage procedures were given to the affected lobes. The outcome tools used in the study were Pulmonary Function Test to measure Force Vital Capacity (FVC), Forced Expiratory Volume in one second (FEV1) and Peak Expiratory Flow Rate (PEFR) and Pulse Oxymetry was used to measure SPO_2, which were done before administering the treatment and at the end of treatment for both the groups.

3.13 TECHNIQUES

3.13 (a) ACTIVE CYCLE OF BREATHING

People with a lung problems often cough and produce more phlegm (sputum) than is usual. It is important to remove sputum from your lungs to help you breathe more easily, prevent chest infections and reduce bouts of coughing. Leaving sputum in your chest can make your condition worse.

The Active Cycle of Breathing Techniques (ACBT*)* is one way to help you to clear sputum from your chest. ACBT is a set of breathing exercises that loosens and moves the sputum from your airways. The ACBT exercises are breathing control, deep breathing and huffing which are performed in a cycle until your chest feels clear.

Breathing Control

- Breathing control is breathing gently, using as little effort as possible.
- Breathe in and out gently through your nose if you can. If you cannot, breathe through your mouth instead
- If you breathe out through your mouth you can use breathing control with 'pursed lips breathing'
- Try to let go of any tension in your body with each breath out
- Gradually try to make the breaths slower
- Try closing your eyes to help you to focus on your breathing and to relax

It is very important to do Breathing Control in between the more active exercises of ACBT as it allows your airways to relax. Breathing control can also help you when you are short of breath or feeling fearful, anxious or in a panic.

Deep Breathing Exercises

Take a long, slow, deep breath in, through your nose if you can. Try to keep your chest and shoulders relaxed. Breathe out gently and relaxed, like a sigh. You should do 3-5 deep breaths. Some patients find it helpful to hold their breath for about 2-3 seconds at the end of the breath in, before breathing out. Try the deep breathing exercises both with and without holding your breath and see which works best for you.

Huffing

A huff is exhaling through an open mouth and throat instead of coughing. It helps move sputum up your airways so that you can clear it in a controlled way. To 'huff' you squeeze air quickly from your lungs, out through your open mouth and throat, as if you were trying to mist up a mirror or your glasses. Use your tummy muscles to help you squeeze the air out, but do not force it so much that you cause wheezing or tightness in your chest. Huffing should always be followed by breathing control. There are 2 types of huff, which help to move sputum from different parts of the lungs.

The Small-long huff

This will move sputum from low down in your chest. Take a small to medium breath in and then huff (squeeze) the air out until your lungs feel quite empty, as detailed above.

The Big-short huff

This moves sputum from higher up in your chest, so use this huff when it feels ready to come out, but not before. Take a deep breath in and then huff the air out quickly. This should clear your sputum without coughing.

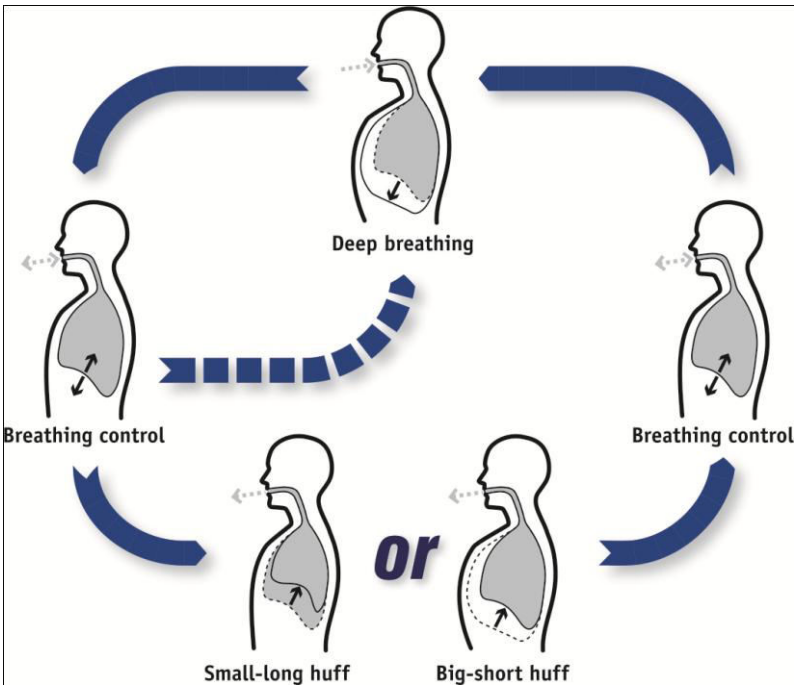


Fig 3.1 ACTIVE CYCLE OF BREATHING

3.13(b) POSTURAL DRAINAGE

Left Lower Lobe

Lie on your right side with your head down and a pillow under your hips and legs.

Percuss the left side from the armpit to the bottom of your ribs.

Bend your left leg and rotate your body so your chest is pointing down.

Percuss the back on the left side from shoulder blade to bottom of the ribs.

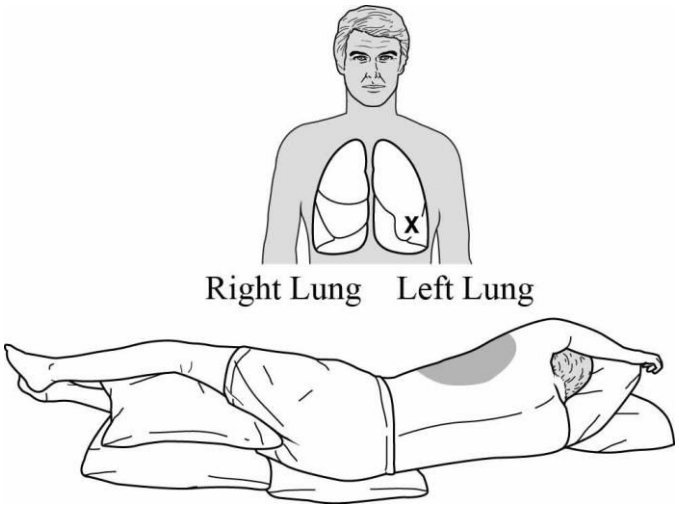


Fig 3.2 POSTURAL DRAINAGE

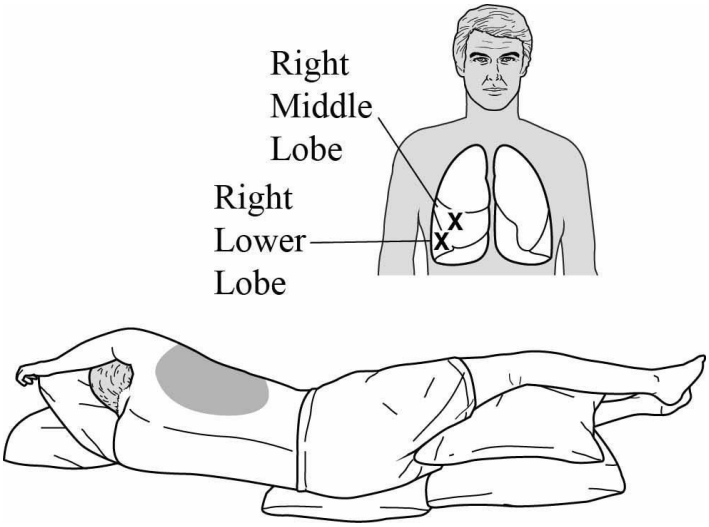
Right Lower and Middle Lobes

Lie on your left side with your head down and pillows under your hips and legs.

Percuss right side from the armpit to the bottom of the ribs.

Bend your right leg and rotate your body so your chest is pointing down.

Percuss the back on the right side from the shoulder blade to bottom of the ribs.

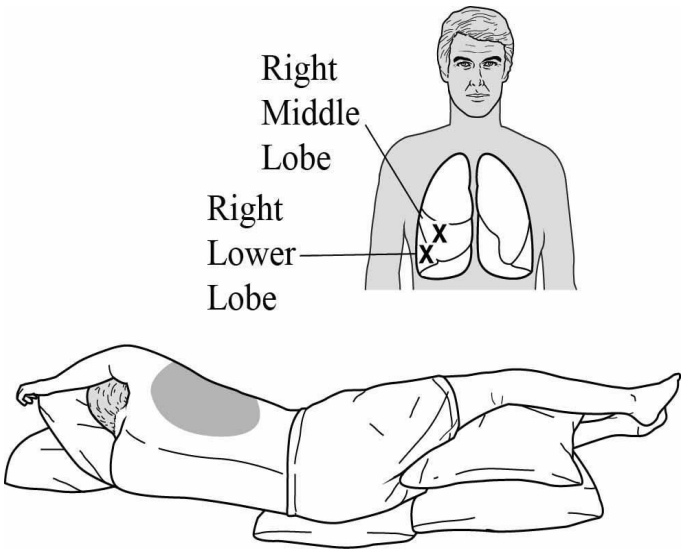


Right Lower and Middle Lobes

Lie on your left side with your head down and pillows under your hips and legs. Percuss right side from the armpit to the bottom of the ribs.

Bend your right leg and rotate your body so your chest is pointing down.

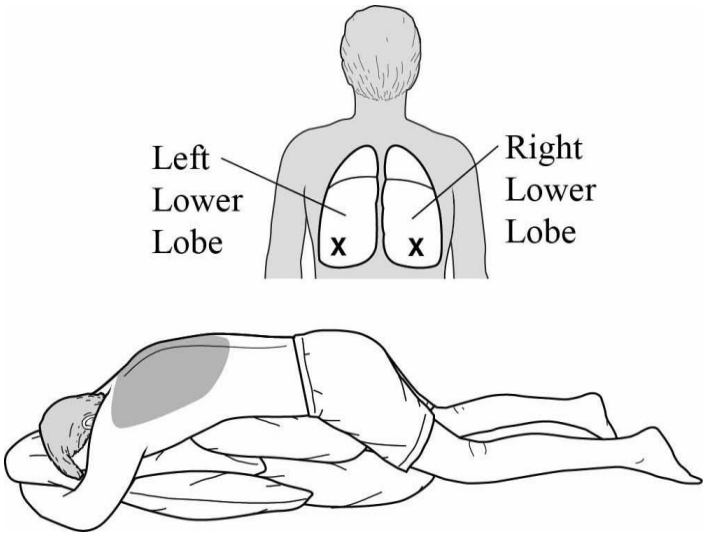
Percuss the back on the right side from the shoulder blade to bottom of the ribs.



Right and Left Lower Lobes (Back)

With this position you can drain and percuss both lower lobes at the same time. This position may be difficult for you if you have a trach or are on a ventilator. Lie face down with a pillow under your chest and stomach.

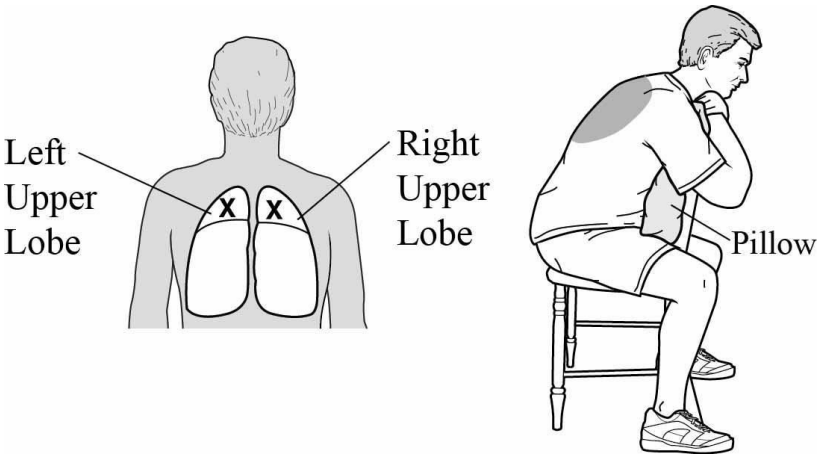
Percuss on either side of the spine from the shoulder blade to the bottom of the ribs.



Right and Left Upper Lobes (Back)

Sit in a chair with a pillow in front of your stomach and lean forward.

Percuss over the shoulder blades on both sides

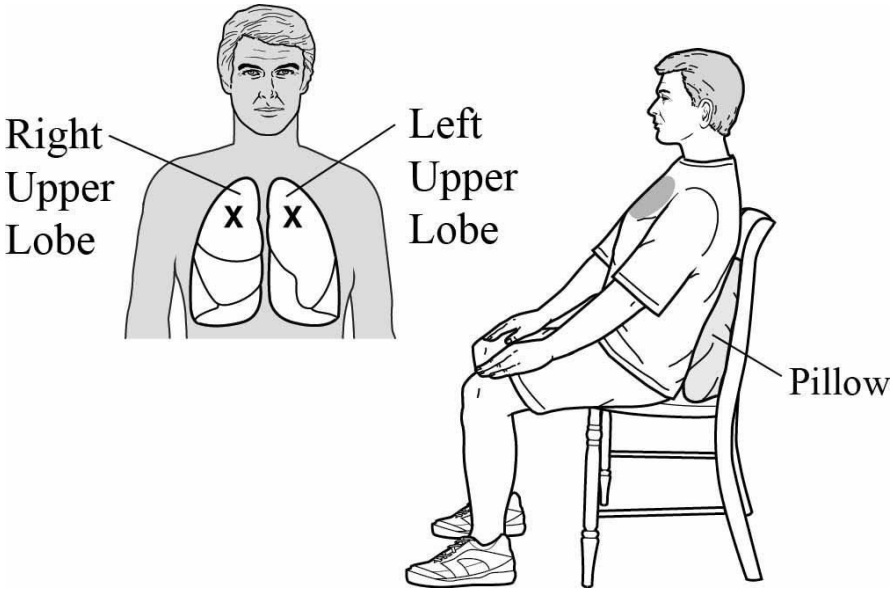


Right and Left Upper Lobes (Front)

Sit up in a chair with a pillow behind your back and lean back.

Percuss over the upper part of both sides of the chest to the nipple.

Percuss only to the top of the breasts in females.



CHAPTER-4

DATA PRESENTATION AND STASTISTICAL ANALYSIS

STATISTICAL TOOLS

The statistical tools used in the study are paired t-test and unpaired t-test.

PAIRED 't'-TEST

The paired t-test was used to find out the statistical significance between pre and post t-test values of PFT and Pulse Oxymetry before and after treatment for Group A and Group B.

Formula for paired t-test,

$$S = \frac{\Sigma d^2 - \frac{(\Sigma d)^2}{n}}{n-1}$$

$$t = \frac{\bar{d}\sqrt{n}}{s}$$

d	=	difference between the pre test V_s post test
$\bar{d}$	=	Mean difference
n	=	Total number of subjects
S	=	Standard deviation

UNPAIRED 't'- TEST

The unpaired t-test was used to compare the statistically significance difference of DHI and VAS before and after treatment for Group A and Group B.

Formula for unpaired t –test,

$$\mathbf{S} = \sqrt{\frac{(n_1-1)s_1{}^2+(n_2-1)s_2{}^2}{n_1+n_2-2}}$$

$$\mathbf{t} = \frac{|\bar{x}_1-\bar{x}_2|}{s\sqrt{\frac{1}{n_1}+\frac{1}{n2}}}$$

n_1 = Total number of subject in group A.

n_2 = Total number of subject in group B.

x_1 = Difference between pre test and post test of Group A.

$\overline{x_1}$ = Mean difference between pre test and post test of group A.

X_2 = Difference between pre test and post test of Group B.

$\overline{X_2}$ = Mean difference between pre test and post test of Group B.

S = Standard Deviation.

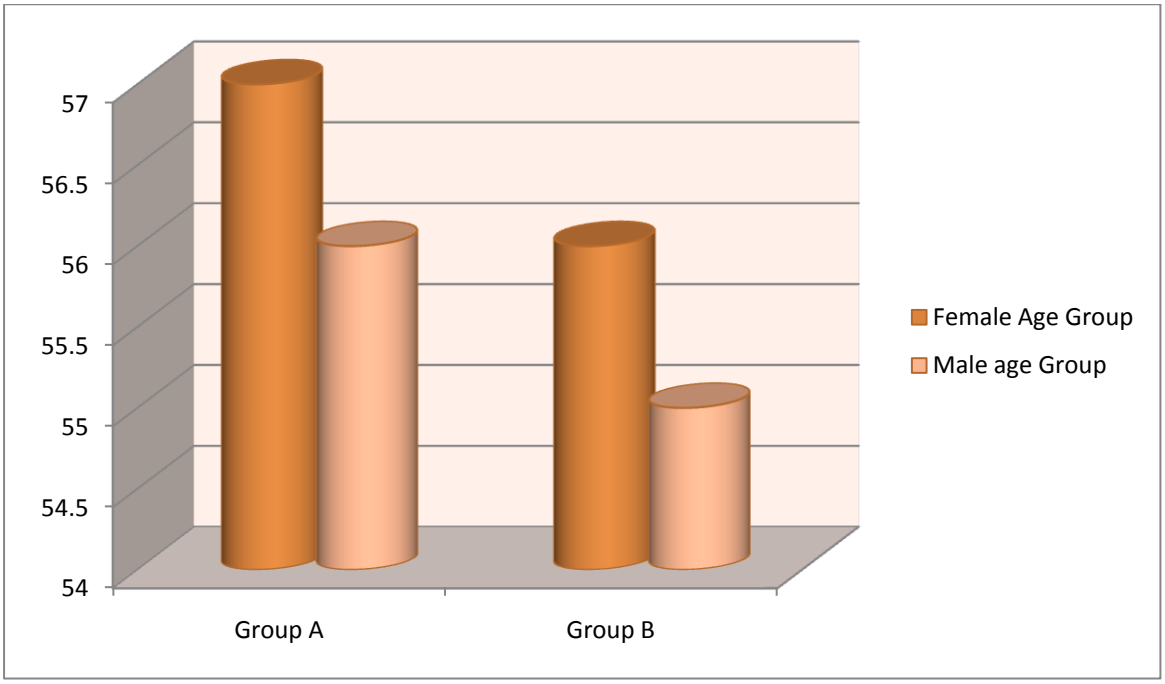
MAIN RESULTS

Table 4.1 and Figure 4.1 shows the age distribution among the study. The patients were in the range of 30-60 years. The mean average age of Group A and Group B were 56.

TABLE-4.1(MEAN AVERAGE AGE GROUP OF GROUP A AND GROUP B)

Mean Age Group	Group A	Group B
Female's	57	56
Male's	56	55

FIG-4.1(MEAN AVERAGE AGE OF GROUP A AND GROUP B)



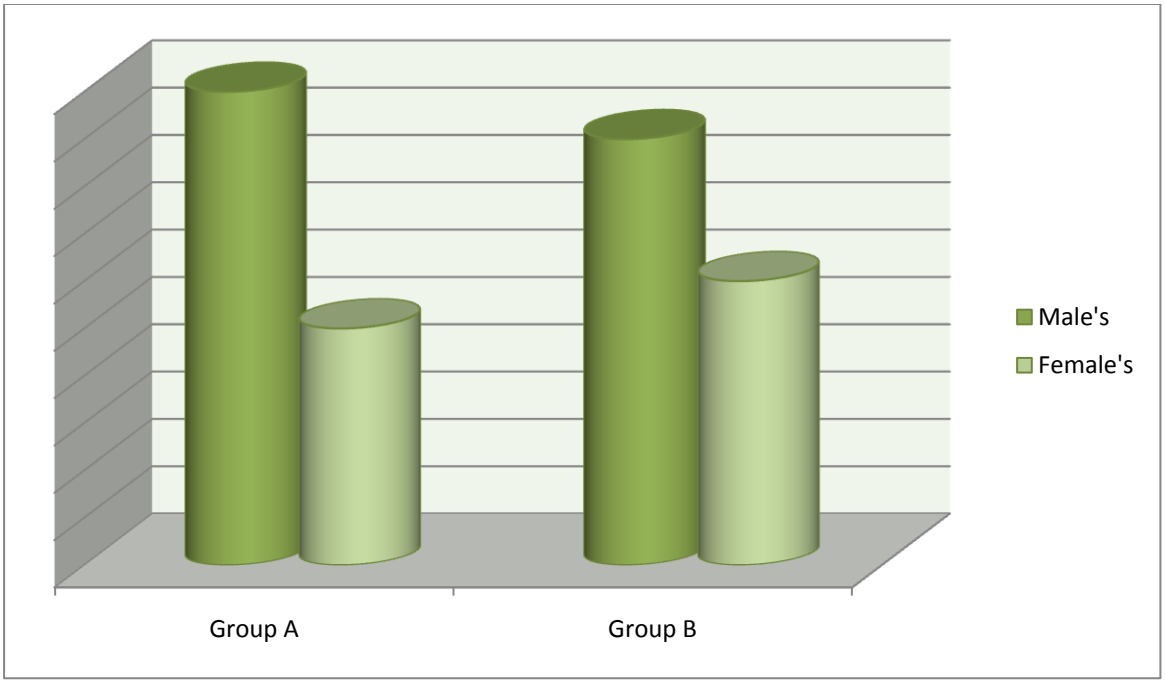
SEX DISTRIBUTION OF GROUP A AND GROUP B

Table 4.2 and Figure 4.2 shows the sex distribution among the study. There are 60% of males and 40% of females in both Groups.

TABLE-4.2

Sex Distribution	Group A	Group B
Male's	10	9
Female's	5	6

FIG 4.2 (SEX DISTRIBUTION OF GROUP A AND GROUP B)



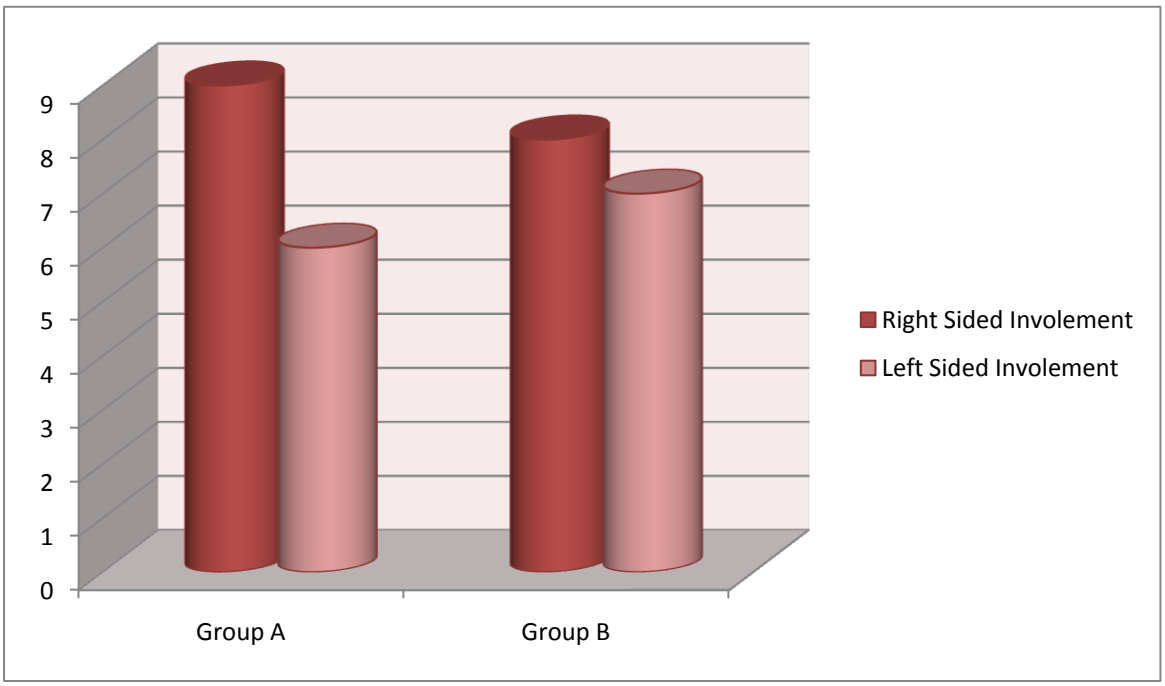
SIDE INVOLVEMENT BETWEEN GROUP A AND GROUP B

Table 4.3 and Figure 4.3 shows the information relating to the sideinvovlement among the patients in the study. The Group A consist of 9 right side lunginvolvement patients and 6 left side lung involvement patients respectively. The Group B consists of 8 right side lung involvement patients and 7 left side lung involvement patients. Right Sided involvement is statistically higher among two group.

TABLE-4.3

Side Involvement	Group A	Group B
Right Side	9	8
Left Side	6	7

FIG-4.3 (SIDE INVOLVEMENT BETWEEN GROUP A AND GROUP B)

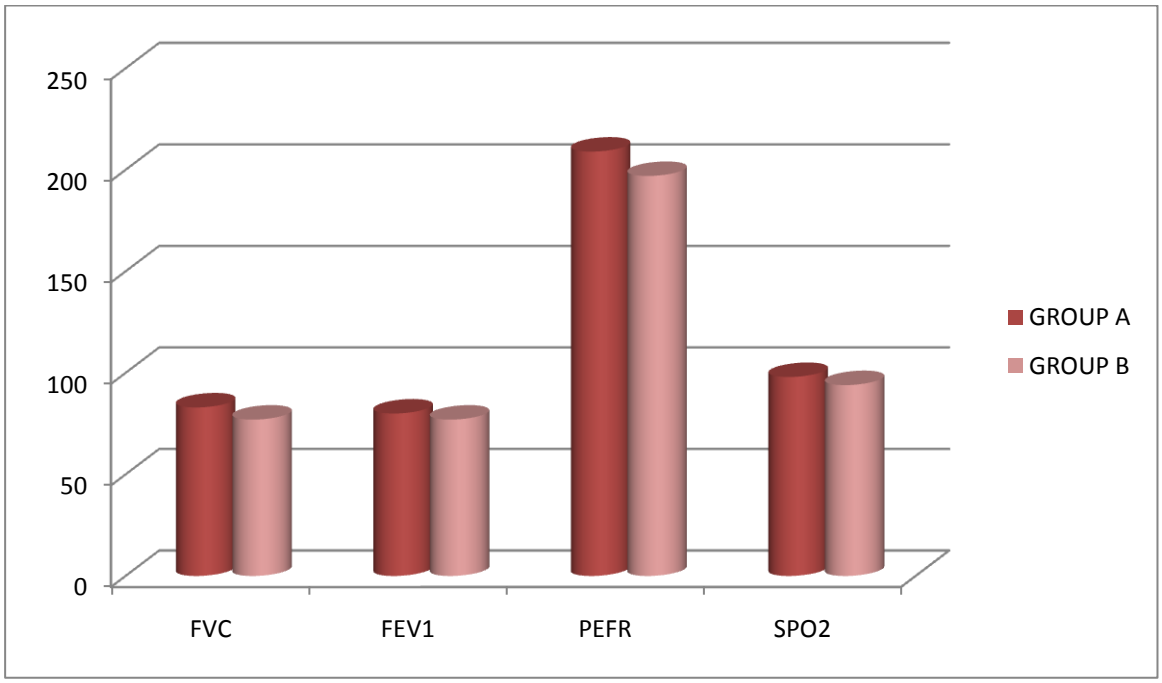


COMPARISON OF VARIABLES MEAN DIFFERENCE BETWEEN GROUP A AND GROUP B OF PFT AND PULSE OXYMETRY

TABLE-4.4

VARIABLES	GROUP A	GROUP B
FVC	83	77
FEV1	80	77
PEFR	209	197
SPO_2	98	94

FIGURE-4.4 (MEAN DIFFERENCE OF FVC, FEV1,PEFR AND SPO_2)

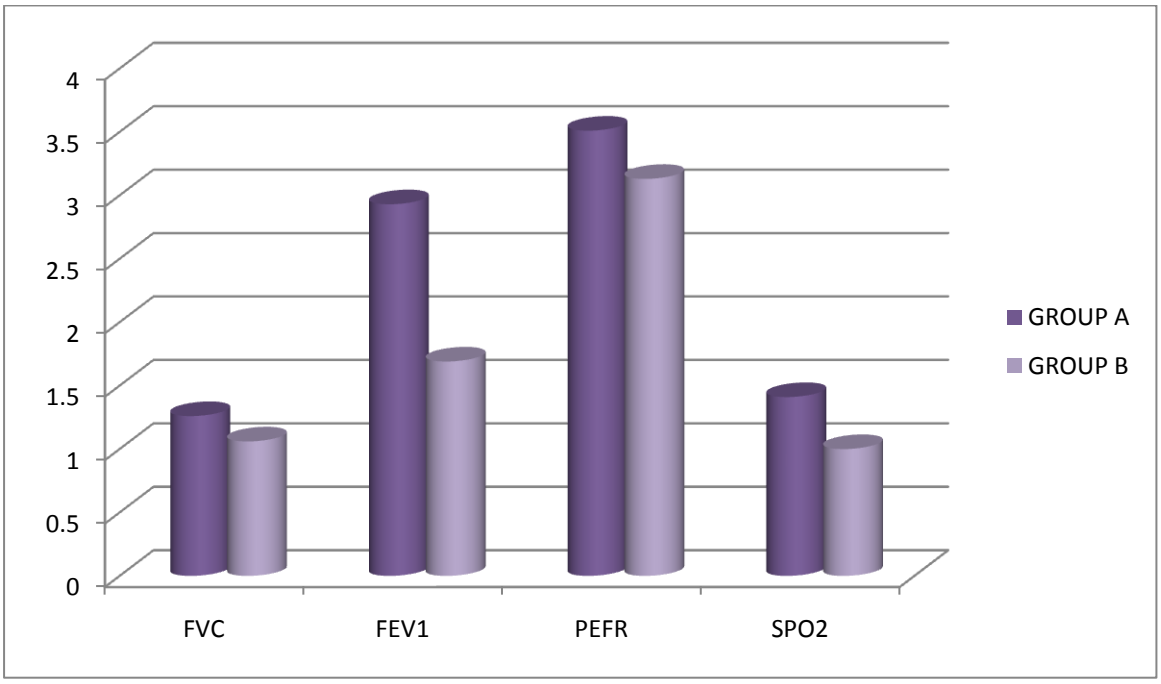


COMPARISON OF VARIABLES STANDARD DEVIATION BETWEEN GROUP A AND GROUP B OF PFT AND PULSE OXYMETRY

TABLE-4.5

VARIABLES	GROUP A	GROUP B
FVC	1.26	1.06
FEV1	2.93	1.69
PEFR	3.51	3.13
SPO_2	1.41	1.00

FIGURE-4.5 (STANDARD DEVIATION OF FVC, FEV1,PEFR AND SPO_2)

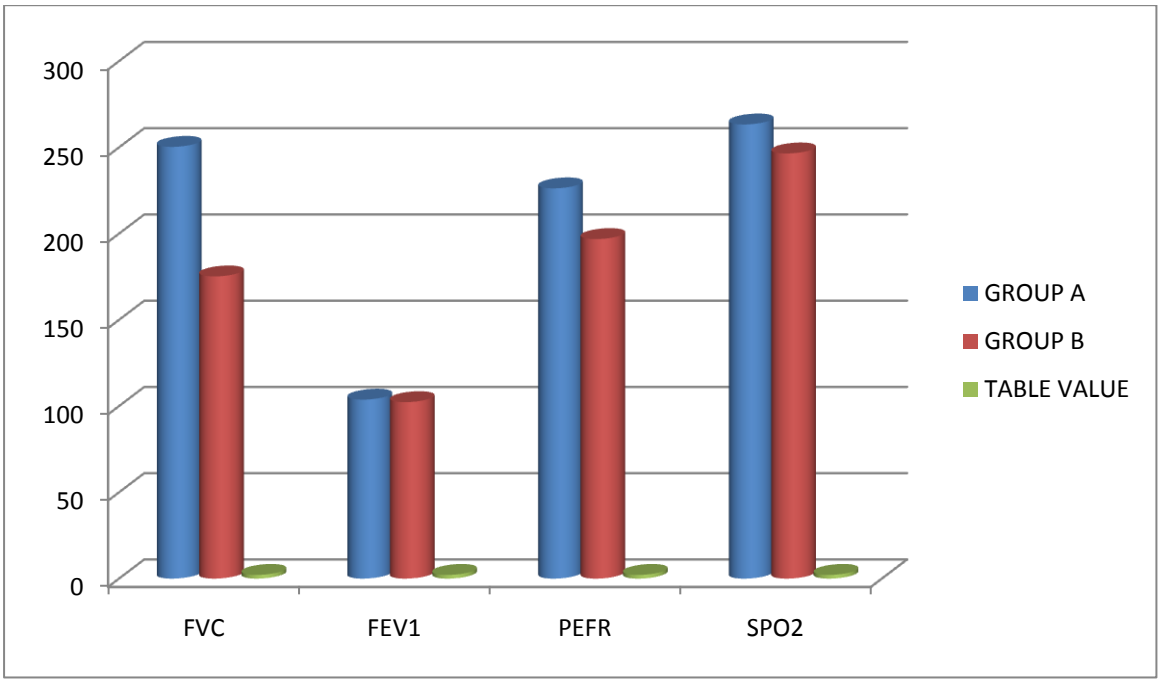


COMPARISION OF THE PAIRED 't' TEST AND TABLE VALUE BETWEEN GROUP A AND GROUP B

TABLE-4.6

GROUPS	CALCULATED ' t'VALUE		TABLE VALUE	SIGNIFICANCE
	GROUP A	GROUP B		
FVC	250.31	175.20	2.15	SIGNIFICANT
FEV1	103.75	102.30	2.15	SIGNIFICANT
PEFR	226.26	196.85	2.15	SIGNIFICANT
SPO_2	263.30	246.50	2.15	SIGNIFICANT

FIGURE-4.6 (PAIRED 't' TEST AND TABLE VALUE OF FVC, FEV1,PEFR AND SPO_2)

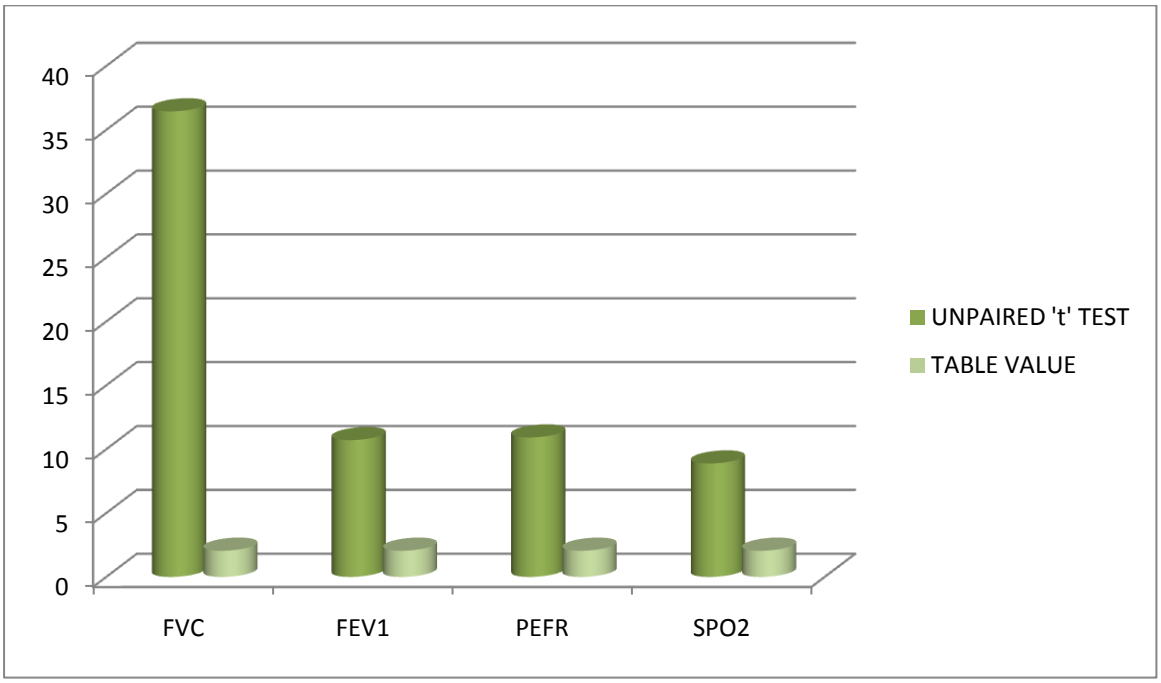


COMPARISION OF UNPAIRED 't' TEST AND TABLE VALUE BETWEEN PFT AND PULSE OXYMETRY

TABLE-4.7

VARIABLES	UNPAIRED 't' TEST	TABLE VALUE	SIGNIFICANCE
FVC	36.45	2.05	SIGNIFICANT
FEVI	10.71	2.05	SIGNIFICANT
PEFR	10.92	2.05	SIGNIFICANT
SPO_2	8.88	2.05	SIGNIFICANT

FIGURE- 4.7 (UNPAIRED 't' TEST AND TABLE VALUE FOR FVC, FEV1,PEFR AND SPO_2)



CHAPTER-5

RESULTS AND DISCUSSION

5.1 RESULTS

The study sample comprised 30 patients, of which 15 were male and 15 were female. The mean age of patients was 56 years. Among 30 patients, 15 were treated with ACBT, and 15 were treated with Postural drainage.

The pre and post test values were assessed by PFT and Pulse Oxymetry in group A and group B. The mean difference value of FVC is 83 and 77, FEV1 is 81 and 77, PEFR is 209 and 197 and SPO_2 is 98 and 94 respectively. The standard deviation of FVC is 1.26 and 1.06, FEV1 is 2.93 and 1.69, PEFR is 3.51 and 3.13 and SPO_2 is 1.41 and 1.00 respectively.The paired 't' test value of FVC is 250.31 and 175.20, FEV1 is 103.75 and 102.30, PEFR is 226.26 and 196.85 and SPO_2 is 263.30 and 246.50 respectively. The paired 't' test value is more than table value 2.15 for 5% level of significance at 14 degrees of freedom.

The calculated 't' values by unpaired 't' test of FVC is 36.45, FEV1 is 10.71, PEFR is 10.92 and SPO_2 is 8.88 respectively The calculated 't' values were more than the table value 2.05 for 5% level of significance at 28 degrees of freedom.

The paired 't' test values have shown that ACBT was more effective than Postural Drainage in improving airway clearance in patients with Bronchiectasis.. The unpaired 't' test values have shown that there was significant difference between two groups in showing improvement in their quality of life in patients with Bronchiectasis.

5.2 DISCUSSION

This was a comparative study between effectiveness of Active Cycle of Breathing Technique and Postural Drainage for improving pulmonary function in bronchiectasis patients. The results shows that, Active Cycle of Breathing Technique is having better effect on clearing the airways in bronchiectasis patients compared with postural drainage. The result of the study supports the hypothesis that there will be a significant effect in airway clearance in bronchiectasis patients using both Active cycle of breathing technique and postural drainage but when both the techniques are compared ACBT is having a better effect than Postural Drainage to improve pulmonary function in Bronchiectasis. In a study by Patterson et al in their article stated that, ACBT is a more effective method of airway clearance in bronchiectasis during single treatment sessions. Other study by **Pryor et al** in their study stated that, a decrease in oxygen saturation caused by chest percussion may be avoided by using the ACBT technique. Similar findings were found in studies done by **Savci S et al** who stated that ACBT is effective in cleaning secretions and improving lung functions in Bronchiectasis. The ACBT increased forced vital capacity, peak expiratory flow rate, arterial oxygenation and exercise performance.

Majority of the patients selected in this study reported to have an earlier medical history of infective disease such as Tuberculosis, Post necrotizing pneumonia etc. Bronchiectesis is one of the most common types of COPD secondary to any other infective diseases. There was an earlier study done by **E Silverman et al** who stated in their study that, known causative factors include post infection bronchial damage, post inhalation injury, hypersensitivity reactions, and congenital airway obstructive disorders. One interesting observation made during this study was about the higher quantity of the secretion removed in the early morning treatment session compared with the other treatment sessions the patient had in the same day which may be because it is done for the first time after a gap of 8-10 hours of previous treatment session. This was also noted by **Willy E. Hammon** and **Scot Hasson** earlier. As per the pathology stated by earlier researchers, that bronchiectasis usually affects the lower lobes of the lung, and mostly unilateral, same distribution of affection were observed in this study too. Majority of the cases selected for this study, that's nearly 65% were affected with unilateral bronchiectasis. The same findings were found in prior studies done by **Willy E. Hammon**

and **Scott Hasson** stated Bronchiectasis usually localized in a few segments or in entire lobe of the lung. Most commonly, it is unilateral and effects basal segments of the lower lobes. There are significant changes seen in FVC, PEFR and FEV1 in this study after the intervention of both ACBT and Postural Drainage in bronchiectasis and this findings were supported by **J.A. Pryor** who stated that there is evidence of an improvement in lung function; including FEV1, FVC and maximum expiratory flow rate at 25% and 50% of FVC following the instigation of the ACBT. There is a need for adequately sized, high-quality, randomized controlled trials with uniform patient populations to examine the effects of ACBT and Postural Drainage in Bronchiectasis.

5.3 LIMITATIONS

- The study has been conducted on small sized sample only.
- This study took shorter duration to complete.
- The study limitations include only Bronchiectasis patients alone.

5.4 RECOMMENDATIONS

- A similar study may be extended with larger sample.
- The future study can be compared with percussion techniques also.
- The ACBT may be applied to the other COPD conditions also.
- This ACBT may be compared with breathing exercises also.

CHAPTER-6

SUMMARY AND CONCLUSION

Even though both ACBT and Postural Drainage techniques are found to have significant effect in clearing the airways, the Active cycle of breathing technique has a better effect than the postural drainage and thereby improving pulmonary function in patients with bronchiectasis.

Through the results, **alternate hypothesis is accepted and also the study could be concluded that there is a significant difference between active cycle of breathing technique and postural drainage in patients with bronchiectasis.**

WEBSITES

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3. www.ncbi.nlm.gov
4. www.neuropt.org
5. www. physio-pedia.com
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APPENDIX –I

ASSESSMENT PERFORMA

PERFORMA FOR DATA COLLECTION

A. PERSONAL DETAILS

1. Name :
2. Age :
3. Sex :
4. Occupation :
5. Father's/Mother's name :
6. I.P. No. /O.P. No :
7. Date :
8. Address :
9. Cheif Complaints :

B. HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEMS

General

The following characteristics of each symptom should be elicited and explored:

- Onset – sudden or gradual
- Location – radiation
- Duration – frequency, chronology
- Characteristics – quality, severity
- Aggravating and precipitating factors
- Relieving factors
- Current situation (improving or deteriorating)
- Effects on Activities of Daily Living (ADL)
- Previous diagnosis of similar episodes
- Previous treatments and efficacy

Cardinal Signs and Symptoms

In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited, as follows:

Cough

- Quality
- Severity
- Timing
- Duration: greater than 2 weeks (screen for Tuberculosis (TB)

Sputum

- Colour
- Amount
- Consistency
- Purulence, odour, foul taste
- Time of day, worse

Haemoptysis

- Amount of blood
- Frank blood or mixed with sputum
- Association with leg pain, chest pain, shortness of breath

Shortness of Breath

- Exercise tolerance (number of stairs client can climb or distance client can walk)
- Posture – orthopnea or tripoding
- Shortness of breath at rest
- Association with Paroxysmal Nocturnal Dyspnea (PND)
- Associated swelling of ankles or recent weight gain

Cyanosis

- Central vs peripheral
- When does it occur
- Any recent changes in pattern of
- Associated wheeze

Chest Pain

- Associated symptoms
- Relation to effort, exercise, meals, bending over
- Explore the pain carefully – include quality, radiation, severity, timing

Fainting or Syncope

- Weakness, light-headedness, loss of consciousness
- Relation to postural changes, vertigo or neurological symptom

Extremities

- Edema:

  - site

  – relation of edema to activity or time of day

- Intermittent claudication (exercise-induced leg pain)

  - distance client can walk before onset of pain related to claudication

  - time needed to rest to relieve claudication

  - temperature of affected tissue (warm, cool or cold)

- Tingling
- Leg cramps or pain at rest
- Presence of varicose veins

Other Associated Symptoms

- Fever
- Malaise
- Fatigue
- Night sweats
- Weight loss
- Palpitations

- Nausea and vomiting
- Gastro intestinal reflux

C. MEDICAL HISTORY SPECIFIC TO CARDIO-RESPIRATORY SYSTEMS

- Allergies, including seasonal and environmental
- Medications currently used (prescription and Over The Counter (OTC) e.g., angiotensinconverting
- enzyme (ACE) inhibitors, ß-blockers, (acetylsalicylic acid or ASA), steroids, nasal sprays and inhaled medications (puffers), antihistamines, hormones, diuretics, antacids, steroids, digoxin)
- Herbal/traditional preparations
- Immunizations (e.g., pneumococcal, annual influenza)
- Medical conditions:

  - Frequency of colds and respiratory infections, recent viral illness, joint pain or swelling

  - History of rheumatic fever

  - Nasal polyps, chronic sinusitis, asthma, bronchitis, pneumonia, chronic obstructive pulmonary disease (COPD), TB (disease or exposure), cancer, cystic fibrosis

  - Dyslipidemia, hypertension, diabetes mellitus, thyroid disorder, chronic renal disease, systemic lupus erythematosus

  - Coronary artery disease (CAD), angina, myocardial infarction (MI)

  - Cardiac murmurs, valvular heart disease

  - Down's Syndrome
- Date and result of last Mantoux test and chest x-ray
- Admissions to hospital and/or surgery for respiratory or cardiac illness
- Blood transfusion
- Family History (Specific to Cardio-respiratory Systems)

Family History (Specific to Cardio-respiratory Systems)

- Others at home with similar symptoms
- Allergies, atopy
- Asthma, lung cancer, TB, cystic fibrosis, bronchitis
- Diabetes mellitus

- Heart disease: hypertension, ischemic coronary artery disease, MI (especially in family members < 50 years of age), sudden death from cardiac disease, dyslipidemia, hypertrophic cardiomyopathy

Personal and Social History (Specific to Cardio-respiratory Systems)

- Smoking history (number of packages/day, number of years)
- Exposure to second hand smoke, wood smoke, pets, mould
- Crowded living conditions
- Poor personal or environmental cleanliness
- High stress levels (personal or occupational)
- Institutional living Occupational or environmental exposure to respiratory irritants (mining, forest fire fighting)
- Substance use (e.g., alcohol, caffeine, street drugs, including injection and inhaled drugs / solvents)
- Human immunodeficiency virus (HIV) risks
- Obesity
- Immigration or travel abroad

D. PHYSICAL ASSESSMENT

Examination of the ear, nose, and throat should also be carried out because of the interrelatedness between these systems and structures and the functioning of the lower respiratory tract.

Vital Signs

- Temperature
- Pulse
- Respiratory rate
- SpO2
- Blood pressure (BP)
- Peak flow

General Appearance

- Acutely or chronically ill
- Degree of comfort or distress
- Position to aid respiration (e.g., tripod)
- Diaphoresis
- Ability to speak a normal-length sentence without stopping to take a breath
- Colour
- Nutritional status
- Hydration status
- Mental staus

Inspection

- Colour, cyanosis
- Shape of chest
- Symmetry of chest movement
- Rate, rhythm and depth of respiration, respiratory distress
- Intercostal indrawing
- Use of accessory muscles
- Precordium: visible pulsations
- Chest wall scars, bruising, signs of trauma
- Jugular venous pressure (JVP)
- Color of conjunctiva
- Extremities
- Hands – edema, cyanosis, clubbing, nicotine stains, cap refill

- Feet and legs – changes in foot color with changes in leg position i.e., blanching with elevation, rubor with dependency, ulcers, varicose veins, edema (check sacrum if client is bedridden), colour (pigmentation, discoloration), distribution of hair Skin – rashes, lesions,

- Xanthomas

Palpation

- Tracheal position (midline)
- Chest wall tenderness or crepitus
- Respiratory excursion
- Tactile fremitus
- Spinal abnormality
- Nodes (axillary, supraclavicular, cervical)
- Masses
- Apical beat

- Point of maximum impulse (PMI) normally located at the fifth intercostal space, midclavicular line - Assess quality and intensity of apical beat

- Apical beat (PMI) may be laterally displaced, which indicates cardiomegaly

- Identify and assess pulsations and thrills
- Hepatomegaly, right upper quadrant (RUQ) tenderness
- Assess peripheral pulses

– radial, brachial, femoral, popliteal, posterior tibial, dorsalis pedis

- Check for synchrony of radial and femoral pulses

- Edema: pitting (rated 0 to 4) and level (how far up the feet and legs the edema extends) sacral edema

Percussion of lung fields

- Resonance

- Increased resonance over hyperinflated areas

- Dullness to percussion over areas of consolidation

- Location and excursion of the diaphragh

Auscultation of lungs

- Listen for sounds of normal air entry before trying to identify abnormal sounds
- Degree of air entry throughout the chest (should be equal)
- Quality of breath sounds (e.g., bronchial, bronchovesicular, vesicular)
- Ratio of inspiration to expiration
- Adventitious sounds:
- Wheezes (rhonchi), crackles (rales), pleural rub, stridor, decreased breath sounds.

Auscultation of heart

- Listen to normal heart sounds before trying to identify murmurs
- Auscultate at aortic, pulmonic, Erb's point, tricuspid, and mitral. Attempt to identify:

  - Rate and rhythm

  - S1 and S2 sounds and their intensity

  - Added heart sounds (S3 and S4), rubs, splitting of S2

  -murmur

  - Auscultate carotid arteries, abdominal aorta, renal arteries, iliac arteries, and femoral arteries for bruits

Associated Systems

A complete respiratory assessment includes the Ear, Nose and Throat (ENT) system

- Consider Gastro Intestinal (GI)/Genito-Urinary (GU) assessment if appropriate

E. DIAGNOSTIC TESTS

F. TREATMENT

- ACBT
- Postural-Drainage

APPENDIX-II

ETHICAL CLEARANCE

Ethically permission for the study will be obtained from the subjects and a written consent will be taken from each subject who participates in the study, As this study involve human subjects the Ethical Clearance has been obtained from the Ethical committee of PPG college of Physiotherapy, Coimbatore as per the Ethical guidelines for Bio-medical research on human subjects, 2000 ICMR, (Indian Council of Medical Research) New Delhi.

PPG COLLEGE OF PHYSIOTHERAPY,

COIMBATORE.

Informed consent form for the volunteers at "PPG college of Physiotherapy, Coimbatore", who will be participating in the research project entitled: **"EFFICACY OF ACTIVE CYCLE OF BREATHING TECHNIQUE AND POSTURAL DRAINAGE IN PATIENTS WITH BRONCHIECTASIS - A COMPARATIVE STUDY."**

Name of Principal Investigator	271430202 Post graduate student
Name of Organization	Department of Physiotherapy, PPG college of Physiotherapy, Coimbatore.

This Informed Consent Form has two parts:

- Information Sheet (to share information about the research with you)
- Certificate of Consent (for signatures if you agree to take part)

You will be given a copy of the full Informed Consent Form

PART I: Information Sheet

Introduction

I, _____, Postgraduate student in the Department of Physiotherapy, PPG college of Physiotherapy, Coimbatore, am working on my dissertation titled "**EFFICACY OF ACTIVE CYCLE OF BREATHING TECHNIQUE AND POSTURAL DRAINAGE IN PATIENTS WITH BRONCHIECTASIS - A COMPARATIVE STUDY**".

I am going to give you information and invite you to be part of this research. You do not have to decide today whether or not you will participate in the research. Before you decide, you can talk to anyone you feel comfortable with about the research.

There may be some words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask them and get yourself clarified.

Type of Research Intervention

In this study if you are selected, detailed history taking, clinical examination and routine investigations will be done.

Participant selection

Study group: Adult between age groups of 30-60 years presenting with history of brief history of Bronchiectasis.

Procedures and Protocol

Thirty patients who are between 30-60 years with Bronchiectasis will be recruited in study group after obtaining the informed consent. Detailed history, clinical examination and routine blood investigation will be done. After explaining the procedure all the patients will bedivided into 2 study groups each study group consisting of atleast 15patients. First study group will be treated with ACBT. Second study group with Postural Drainage and outcome will be done for each study group at the end of treatment session. The data will be analysed statistically.

Duration: 6 months

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choicewhether you choose to participate or not, it will not affect our patient's treatment process.

Benefits

Personally you might be or may not be benefited in any way directly from the research. But by taking part in this research, you will be helping the scientific community.

Possible risks

There are no major physical risks for the person associated with these methods. Complications include exacerbation of symptoms after maneuver which is rare possibility.

Reimbursements

You won't be given any monetary incentives or gifts for being a part of this research.

Confidentiality

The information that we collect from this research project will be kept confidential. Information about the patient that will be collected during the research will be put away and no-one but the researchers will be able to see it.

Right to Refuse or Withdraw

You do not have to take part in this research if you do not wish to do so. You may also stop participating in the research at any time you choose. It is your choice and all of your rights will still be respected.

Who to Contact

This proposal has been reviewed and approved by the Research and Ethical committee of PPGCollege of Physiotherapy, Coimbatore, which is a committee whose task it is to make sure that research participants are protected from harm.

You can ask me any more questions about any part of the research study, if you wish to. Do you have any questions?

PART II: Certificate of Consent

I have read the foregoing information, or it has been read to me. I have been explained the procedure and complications. I am willing to participate in the study. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Name of Participant_____

Signature of Participant _____

Date _____Day/month/year

If illiterate a literate witness must sign (if possible, this person should be selected by the participant and should have no connection to the research team). Participants who are illiterate should include their thumb-print as well.

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Name of witness_____ Thumb print of participant

Signature of witness _____

Date _____

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

1. Blood investigations:

   Hb, TC, DC, ESR, RBS, Serum electrolytes, Blood Urea and Serum Creatinine.
2. PFT.
3. Postural Drainage.

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this informed consent from has been provided to the participant.

Name of Researcher/person taking the consent_____

Signature of Researcher /person taking the consent_____

Date _____ Day/month/year

APPENDIX - III

GROUP-A

S.No	Age	Sex	FVC		FEV1		PEFR		SPO_2	
			Pre test	Post test	Pre test	Post test	Pre test	Post test	Pre test	Post test
1.	57	M	72	82	65	80	160	210	90	96
2.	57	M	74	84	66	82	165	205	91	97
3.	57	F	73	83	68	84	170	215	92	98
4.	56	M	75	85	70	80	175	215	93	100
5.	57	F	71	81	67	77	160	205	94	98
6.	57	M	73	83	69	85	175	215	95	100
7.	56	M	75	85	69	85	165	205	95	100
8.	57	F	74	84	67	77	155	205	94	98
9.	57	F	72	84	70	80	160	205	95	100
10.	57	F	71	82	65	76	165	210	92	98
11.	56	M	72	82	66	82	155	205	91	98
12.	57	M	70	82	67	80	175	215	92	100
13.	57	M	75	85	65	76	165	205	95	100
14.	56	M	73	83	66	82	160	210	90	98
15	56	M	71	82	69	81	175	215	94	100

F- Female

M-Male

APPENDIX - IV

GROUP-B

S.No	Age	Sex	FVC		FEV1		PEFR		SPO_2	
			Pre test	Post test	Pre test	Post test	Pre test	Post test	Pre test	Post test
1.	56	M	65	75	69	79	175	190	94	95
2.	56	M	66	76	66	76	160	195	95	96
3.	55	M	70	77	65	75	165	190	94	95
4.	56	F	64	78	66	76	155	195	94	95
5.	56	F	67	77	67	77	165	195	92	94
6.	55	M	64	76	69	79	175	200	91	93
7.	56	F	70	78	70	80	170	195	90	92
8.	55	M	65	75	70	78	160	200	90	93
9.	55	M	67	77	69	79	165	195	95	96
10	56	F	64	78	65	75	170	195	92	94
11	56	F	65	76	66	76	155	195	91	93
12	56	F	64	77	65	75	160	200	92	96
13	55	M	70	78	69	79	165	200	93	94
14	55	M	64	76	70	78	165	200	95	95
15	56	M	67	77	68	78	160	200	94	95

F- Female

M-Male

ABSTRACT

Aim:

The Aim of this study is to compare the Efficacy of Active Cycle of Breathing Technique and Postural Drainage in Patients with Bronchiectasis.

Materials and Methodology:

A Quasi Experimental study design consiting of reviews of charts of Bronchiectasis patients. Thirty patients were included, (60%) were males,(40%) were females ; the average age was 56 years. All the patients are presented with unilateral lung involvement. Pre- and Post-Treatment scores of FVC, FEV1, PEFR and SPO_2 are assessed to know their breathing capacity by Pulmonary Function test and Pulse Oxymetry.

Results:

The pre and post test values were assessed by PFT and Pulse Oxymetry in group A and group B. The mean difference value of FVC is 83 and 77, FEV1 is 81 and 77, PEFR is 209 and 197 and SPO_2 is 98 and 94 respectively. The standard deviation of FVC is 1.26 and 1.06, FEV1 is 2.93 and 1.69, PEFR is 3.51 and 3.13 and SPO_2 is 1.41 and 1.00 respectively.The paired 't' test value of FVC is 250.31 and 175.20, FEV1 is 103.75 and 102.30, PEFR is 226.26 and 196.85 and SPO_2 is 263.30 and 246.50 respectively. The paired 't' test value is more than table value 2.15 for 5% level of significance at 14 degrees of freedom.

The calculated 't' values by unpaired 't' test of FVC is 36.45, FEV1 is 10.71, PEFR is 10.92 and SPO_2 is 8.88 respectively The calculated 't' values were more than the table value 2.05 for 5% level of significance at 28 degrees of freedom.

Conclusion:

The paired 't' test values have shown that ACBT was more effective than Postural Drainage in improving airway clearance in patients with Bronchiectasis. The unpaired 't' test values have shown that there was significant difference between two groups in showing improvement in their quality of life in patients with Bronchiectasis.

Keywords:

Pulmonary Function test, Pulse Oxymetry, Active Cycle of Breathing, Postural Drainage.